



Sixth Session of SOUTHEASTERN EUROPE CLIMATE OUTLOOK FORUM

SEECOF-6 MEETING

FINAL VERSION

ANALYSIS AND VERIFICATION OF SEECOF-5 CLIMATE OUTLOOK FOR 2011 SUMMER SEASON FOR SOUTH-EAST EUROPE (SEE)

CLIMATE OUTLOOK FOR 2011 SUMMER SEASON FOR SEE REGION

As stated in the SEECOF-5 Seasonal Climate Outlook for 2011 summer season over South-Eastern Europe Consensus Statement (document: <http://www.seevccc.rs/SEECOF/SEECOF%205/STEP%203/Consensus-Statement-SEECOF-5-climate-outlook-for-summer-2011.pdf>). "In summary, in the most part of the SEECOF region, summer season temperature will be above normal. In the eastern part of south Caucasus and central part of the Balkan peninsula, summer season temperature will be above normal to normal, while no confident signal is detected in the forecasts for the central part of Turkey (within normal values). Uncertainties in regional predictions are larger for precipitation than for temperature. There is no clear summer season precipitation signal for the most part of the SEECOF region. Only the southern part of Greece, central and eastern Mediterranean and Caucasus have tendency for summer season precipitation below normal. It might also be possible that some of the other parts, especially mountainous parts, locally might have above normal summer season precipitation, due to episodes of the enhanced convection with high intensity rainfall. Climate outlook for the 2011 summer season for the SEE region is presented in Figure 1.

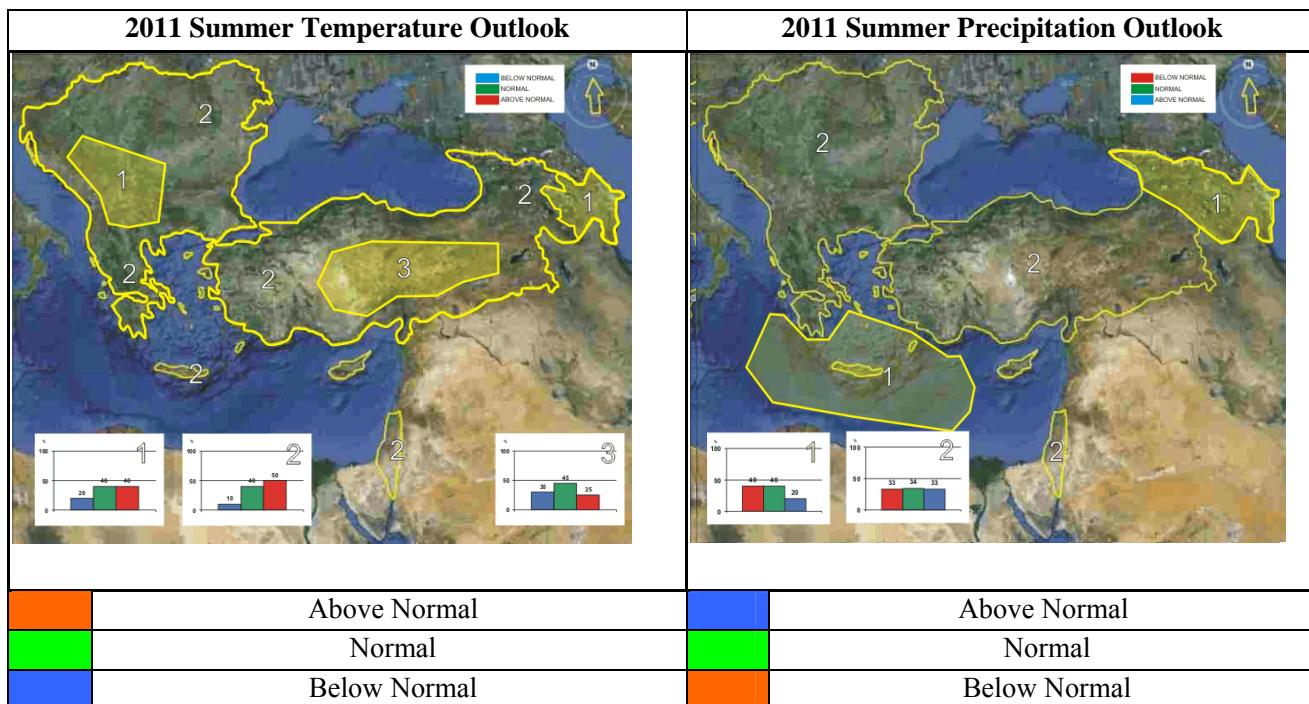


Figure 1. Graphical presentation of the climate outlook for 2011 summer season for the SEE region

A SHORT ANALYSIS OF THE 2011 SUMMER SEASON FOR THE SEE REGION

Analyses of the summer season temperature and precipitation anomalies are based on:

- operational products of the European Climate System Monitoring – ECSM (the ECSM system is a technical platform of the DWD, WMO RA VI RCC Node on Climate Monitoring, <http://www.dwd.de/ecsm>;
- seasonal bulletin on climate in the WMO region VI for the summer of 2011, (ECSM, DWD, WMO RA VI RCC Node on Climate Monitoring, <http://www.seevccc.rs/SEECOF/SEECOF-6/STEP%201/Climate-Report-summer-season-2011-exp-RCC-CM.pdf> ,
- climate monitoring products of the South East European Virtual Climate Change Center - SEEVCCC (Member of the WMO RA VI Pilot RCC Node on Climate Monitoring, http://www.seevccc.rs/imgsrc/clim_mon/201108/ , and
- national climate monitoring reports of the following SECOF-6 participating countries: Armenia, Azerbaijan, Bulgaria, the Federation of Bosnia and Herzegovina, Croatia, Cyprus, Georgia, Greece, Hungary, Israel, the FYR of Macedonia, the Republic of Moldova, Romania, Slovenia, Serbia and Turkey (documents available on: <http://www.seevccc.rs/SEECOF/SEECOF-6/STEP%201/>)

Summer mean temperatures in the lowlands of the SEECOF area mostly ranged between 20°C and 25°C, along the coasts of Adriatic and Aegean sea, in the east Mediterranean and in Israel above 25°C, while they were below 15°C at some higher elevations. Absolute maximum temperatures were between 34°C and 40°C in many parts of the area, and in the east and southeast above those values. At the beginning of August, Syunik region in Armenia reached 43.7°C, which is the highest temperature value ever observed. The nights were also slightly warmer. Also, the number of tropical nights in some parts of south-eastern Europe, such as the Pannonian plain, the central part of the Adriatic coast, as well as the coasts along Mediterranean Sea and Black Sea was clearly above normal. Summer was warm over almost the whole SEECOF area, while it was warmer in the western part of the Balkan Peninsula. Anomalies were above +1°C over almost the whole area, while in its western-northwesternmost parts above +2°C. The only exception was the region of Turkey, where they were between 0°C and +1°C. Summer season temperatures are presented in Figure 2 (left panel).

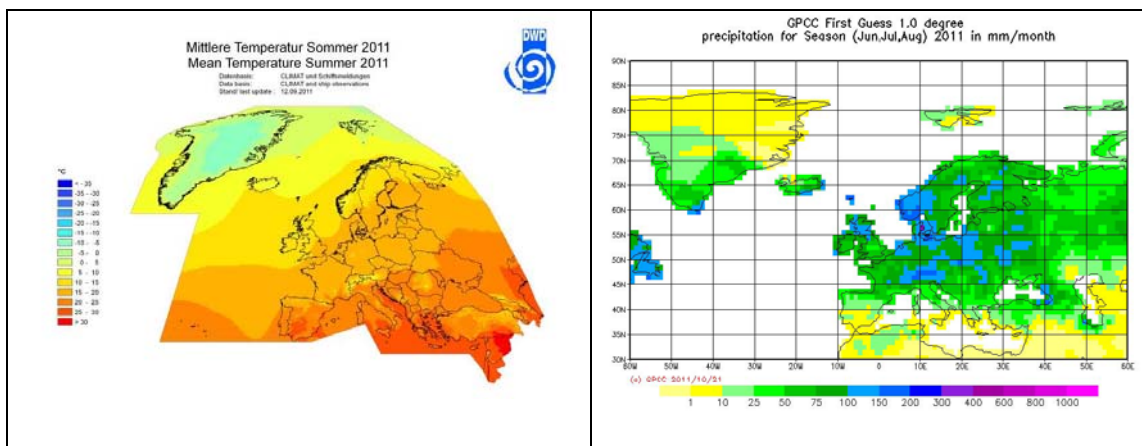


Figure 2. Summer season 2011 observed temperatures (left panel) and summer season observed precipitations in mm per month (right panel). Source: <http://www.dwd.de/ecsm>

All the three summer months were normal or warmer than normal in the most part of the SEECOF region, with the exception of the inland of Turkey, where June was colder or near normal. The highest anomalies mostly occurred in the end of the season. Summer season temperature anomalies are presented in Figure 3 (left panel).

The summer precipitation totals over the SEECOF area ranged from less than 10 mm in southern Turkey, southern Greece and Cyprus, up to more than 150 mm along the western coasts of Black Sea and the northeast of the Carpathian region, and even much higher on local level. Summer season precipitations are presented in Figure 2 (right panel).

Precipitation anomalies were very diverse within the SEECOF area. It was considerably drier than normal (<75% of the long-term average), particularly in the most part of the Balkan, central and eastern Mediterranean, on the western, southern and north-eastern coasts of Turkey, as well as in the southern and western parts of Caucasus. It was, in

contrast, mostly wet in the inland of Turkey, on the northeast of Greece and in some parts of the mountainous region of the Balkan Peninsula.

During June, it was mostly dry in almost the whole SEECOF area, except in the Carpathian region, western Caucasus and the inland of Turkey, mainly due to convective activity. Several parts of Turkey were thus affected by floods. In July it was normally dry in the most of the SEECOF region; it was dry in western Caucasus, while the northern half of the Balkan Peninsula was almost above normal due to heavy rain events with thunderstorm and hail, observed during the third decade of July. August was, in contrast, dry, with the exception of the Rhodope mountain region in Bulgaria and eastern Caucasus. Summer season precipitation anomalies are presented in Figure 3 (right panel).

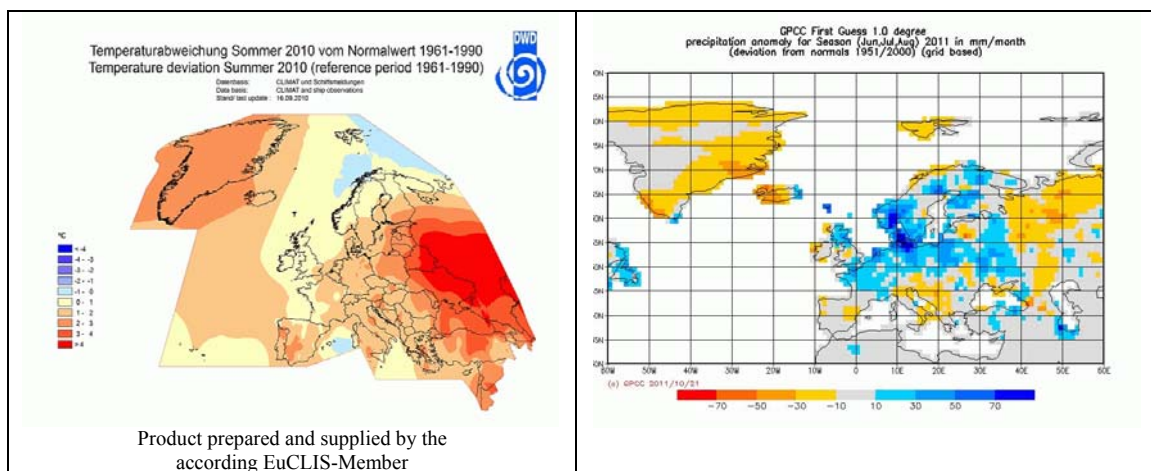


Figure 3. Summer season 2011 observed temperature anomalies (left panel) and summer season observed precipitation anomalies in mm per month (right panel). Source: <http://www.dwd.de/ecsm>

VERIFICATION OF CLIMATE OUTLOOK FOR THE 2011 SUMMER SEASON

The SEECOF-5 climate outlook for the 2011 summer season concluded that seasonal temperatures over the most of the SEECOF region would be above normal. In the eastern part of south Caucasus and the central part of the Balkan peninsula summer season temperature would be above normal to normal, while no confident signal was detected in the forecasts for the central part of Turkey (within normal values). On the basis of the aforementioned regional, subregional and national climate monitoring products, it appeared that the monitored anomalies were normal to above normal over the most part of the SEECOF region, while they were clearly above normal over the most part of the Balkan Peninsula and the western part of Israel. The inland of Turkey and the south-western parts of Caucasus were within normal values. The outlook was, altogether, correct, with the exception of Albania and the easternmost and westernmost parts of Turkey.

According to SEECOF-5, uncertainties in regional predictions are larger for precipitation than for temperature. There is no clear summer season precipitation signal for the most of the SEECOF region. Only the southern part of Greece, central and eastern Mediterranean and the Caucasus have a tendency toward below normal summer season precipitation. It could also be possible that some of the other parts, especially mountainous parts, locally might have above normal summer season precipitation due to episodes of the enhanced convection with high intensity rainfall.

Monitored summer precipitation shows that most of these features were quite well predicted (deficiency of precipitation in the southern part of Greece, central and eastern Mediterranean and the eastern part of Caucasus, as well as surplus of precipitation in some other parts, especially in the mountains), and that some other features were not, e.g. deficiency of precipitation in greater part of the Balkan peninsula and high precipitation in the northeast of Aegean Sea. In the areas with small amount of precipitation, mainly of convective origin, the trends in terms of percentage could be misleading.

APPENDIX A: Contributions to pre Pre-COF of SEECOF-6

- World Meteorological Organization
- Deutscher Wetterdienst, Federal Republic of Germany
- South East European Virtual Climate Change Center hosted by Republic Hydrometeorological Service of Serbia, Republic of Serbia
- Royal Netherlands Meteorological Institute, The Netherlands
- Armenian State Hydrometeorological and Monitoring Service, Republic of Armenia
- National Hydrometeorological Department, Republic of Azerbaijan
- National Institute of Meteorology and Hydrology, Republic of Bulgaria
- Meteorological and Hydrological Service, Republic of Croatia
- Hellenic National Meteorological Service, Greece
- Meteorological Service, Republic of Cyprus
- Department of Hydrometeorology, Georgia
- Meteorological Service of the Republic of Hungary, Republic of Hungary
- Israel Meteorological Service, State of Israel
- Republic Hydrometeorological Institute, Former Yugoslav Republic of Macedonia
- State Hydrometeorological Service, Republic of Moldova
- Federal Hydrometeorological Service of the Federation of Bosnia and Herzegovina, Federation of Bosnia and Herzegovina, Bosnia and Herzegovina
- National Meteorological Administration, Romania
- Republic Hydrometeorological Service of Serbia, Republic of Serbia
- Meteorological Office, Republic of Slovenia
- Turkish State Meteorological Service, Republic of Turkey

APPENDIX B: Analysis and verification of the SEECOF-5 climate outlook for the 2011 summer season:

Verification summary based on the national reports and contributions of the participants of Pre Pre-COF of the SEECOF-6 meeting

Country	Seasonal temperature (JJA)		Seasonal precipitation JJA		High Impact Events
	Observed	SEECOF-5 climate outlook for temperature	Observed	SEECOF-5 climate outlook for precipitation	
Armenia (1)	Above normal	Above normal to Normal	Below normal to Normal Above normal (in mountainous parts)	Below Normal To Normal	<p>During June and July convective related severe weather phenomena (thunderstorm, hail with diameter max 25mm, heavy rainfall 40mm/2hour and 31mm/12hour in Tashir, 37mm/40min in Vanadzor, strong wind with wind-gusts up to 16-25m/s) were observed on several days.</p> <p>Although August convective related weather phenomena are not typical for Armenia, hail was observed in Aparan 51mm/40min, in Sevan, Aparan and Hrazdan during this summer.</p> <p>A heat wave was observed during the end of July and the beginning of August. High, record breaking temperatures of 43,7⁰C were registered in Syunik Region, surpassing the previous record (2005) by 0.6 degrees. The registered duration of hot days with the temperature from 40 to 42⁰ C in the Ararat valley sequence has been the longest ever since the beginning of measurements.</p>
Azerbaijan (1)	Above normal to Normal	Above normal to Normal	Near to Above normal	Below Normal To Normal	<p>Maximum air temperature almost over all the country, including highhills, reached its absolute maximum for July and in some regions even broke it, such as Culfa with 44.7⁰C. Heat wave continued on the start of August</p>

					<p>when absolute maximum of temperature was broken on the August 3rd in Baku with 40,0⁰C and Sumgayit with 42.4⁰C.</p> <p>In August, the most high amount of precipitation was in Absheron peninsula (from 413-433 % of normal) and in Lankoran up to 523 % of normal. Insignificant River floods observer in some places.</p>
<p>Federation of Bosnia and Herzegovina, Bosnia and Herzegovina (1)</p>	Above normal	Above normal	Below normal	No clear signal	No comment.
<p>Bulgaria (4)</p>	Above to normal	Above normal	Normal	No clear signal	<p>There was a strong precipitation event around 10-11 August 2011, mostly in the north-central part of the country and over the Rhodope Mountains in the south. The registered precipitation amounts were as big as 30-90 mm, which is harmful, but not exceptional. These precipitation amounts, however, exceed the monthly norm and turn those parts of the country relatively wet on the monthly scale.</p> <p>Thunderstorm episodes in mid July (24-25 July 2011) caused damage mostly in the Danube plane towns. Precipitation amounts were as big as 20-50 mm and exceeded the monthly norm. That is why the north-central part of the country is wet in July on monthly basis.</p>

Croatia (1)	Above normal	Above normal	<p>Below normal in several areas of the north-western, central and eastern part of the country, some areas located at northern and southern Adriatic and a part of middle Adriatic with its hinterland.</p> <p>Normal in northern Adriatic, parts of central Croatia as well as some areas of middle and southern Adriatic.</p> <p>Above normal in a small part of southern Adriatic and an area located in hinterland of</p>	No clear signal	No comment.
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			middle Adriatic.		
Cyprus (1)	Above normal	Above normal	No comment	No clear signal	Unstable weather conditions prevailed on June 1, 2, and 5, during the period of June 12-14 and on June 28, giving local rain, isolated thunderstorms and hail.
Georgia (1)	Above normal in most of the territory Normal in the Eastern parts	Above normal	Near normal in the most of the territory Below normal the easternmost parts	Below normal to Normal	No comment.
Greece (1)	Above normal To Normal	Above normal	Below normal Over mainland Normal In the most of Aegean Sea with islands Above normal on the Sporades and in the northeast of Aegean Sea	Below normal in the southern part No clear signal In the most of the country	No comment.
Hungary (2)	Above normal	Above normal	Below normal	No clear signal	No comment.
Israel (1)	Above normal	Above normal	No comment.	No clear signal	No comment.
FYR	Above normal	Above normal	Below normal	No clear signal	No comment

of Macedonia (1)					
Republic of Moldova (1,2)	Above normal	Above normal	Normal In the northern and southern parts Above normal In the central parts of the country	No clear signal	<p>Summer mean air temperature has been observed in average once in every 3 years in the last 20 years. The maximal air temperature in summer had reached +36°C (July, Falesti, Dubasari), the minimal reached +6°C (August, Baltata). The number of days with maximal temperatures of 30°C and higher constituted from 24 (MS Chisinau) to 43 days (MS Dubasari), while the norm is 13-27 days.</p> <p>In July-August, in the biggest part of the territory a precipitation deficit was observed – in two months there had fallen 50-80 mm or 50-70% of the norm. In some areas (MS Chisinau, Baltata, AMP Anenii Noi, Basarabasca) their amount constituted 15-30 mm (15-30% of the norm), which was observed only once in 10 years during the last 20 years, and at the MS Baltata – for the first time since the beginning of observations.</p> <p>During the summer season, there occurred hazardous meteorological phenomena such as heavy rains (June, July), that led to electricity power shutting down and agricultural lands damaging</p>
Montenegro (1)	Above normal	Above normal	Normal in the northern and eastern parts Below normal	No clear signal	No comment

			in the most of the country		
Romania (1,2)	Above normal	Above normal	Above normal in southern and central parts Below normal over the western and eastern regions Normal Elsewhere	No clear signal	No comment
Slovenia (1)	Above normal	Above normal	Below normal	No clear signal	There were two heat waves observed - in the first half of July and in the second half of August. During the period from 22 to 26 August 2011 we had 5 consecutive days in Ljubljana with maximum temperature above 35°C. The average summer temperature in Ljubljana was 21.3°C (the same as the summers of 1998 and 1994). Only the summer of 2003 was even much warmer with the average summer temperature of 23.4°C.
Serbia (1,2,5)	Above normal	Above normal in the northern part to Normal in the most of the country	Below normal in the most the of the country Normal in the mountainous areas of the western and the	No clear signal	Two heat waves were recorded on the Serbian territory during the summer of 2011 (Heat wave definition: period of 6 or more consecutive days in which the maximum temperature is minimum 5.1 °C higher than the average maximum temperature for each of those days during the 1961-1990 period). The first heat wave, with a maximum duration up to 8 days, was recorded in the parts of northern and central Serbia in the first half of July. The second heat wave was registered in the third decade of

			eastern part of central Serbia		<p>August, and its maximum duration was up to 13 days. In Vojvodina, the August heat wave lasted shorter, while it was not recorded at all in the far east of Serbia.</p> <p>New historically lowest water levels were recorded in the Velika Morava river basin.</p>
Turkey (2)	<p>Normal in the most of the territory</p> <p>Above normal on south coasts of Aegean Sea</p>	<p>Above normal in the most of the country</p> <p>Normal in the central and eastern parts of inland</p>	<p>Below normal on south coasts of Aegean Sea</p> <p>Normal the rest of the country</p>	No clear signal	<p>In June 2011, some series of severe events, such as heavy thunderstorm and hail with strong winds, as well as floods affected several parts of Turkey. The most notable event, heavy rain and thunderstorm caused flood in Ankara, on 16th and 17th June, 2011. Some precipitation values were the new records for some parts of Ankara. On 2nd August a small tornado occurred near Ancara.</p>

Note:

- 1 - Basic climatological period (1961-1990)
- 2 - Basic climatological period (1971-2000)
- 3 - Basic climatological period (1951-2000)
- 4 – Basic climatological period (1980-2009)
- 5 – Basic climatological period (1981-2010)
- 6 – No information about basic climatological period